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Abstract

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The authors describe in a short introduction the present, mainly hydro - electric, power system in Portugal, and then refer to its future development in comparison to the estimated growth of power consumption. A brief evaluation of national energy resources is also made. These subjects are not dealt with in detail.

A first chapter is devoted to analysing the main technical factors on which depends the integration of conventional and nuclear thermal plants within the present power system.

The main factor concerns the way thermal plants may be placed within the load durations. A model is defined to study this factor, which attempts to evaluate the possibilities of concentrating energy production in those thermal plants having the lowest variable costs, without impairing optimum use of hydro incoming energy, and eventually without prejudice to the need for assigning supplementary thermal capacity to peak load duty during periods of high water flow. Application of this model leads to curves showing the future development of the thermal capacities that may be placed within the load durations under a constant marginal criterium. A few remarks are added concerning the operating characteristics of the various levels of thermal capacities, as drawn from the above curves. Those cha

racteristics pertain to the needs for daily and weekly load variation.

The factors determining the size of the largest generating set in operation are then evaluated, this analysis being made in qualitative terms owing to a lack of economic data concerning the portuguese network. Regarding the siting of future thermal plants of various types, geographic and economic aspects are considered in relation to the regional distribution of power consumption.

The second chapter attempts to evaluate the possibilities of integrating nuclear plants within the national power system, having in due regard the technical factors referred to above. Technical and economic characteristics are referred concerning the plants of various types to be considered: hydro plants, conventional thermal plants, thermal plants for peak duty, and nuclear plants. Changes in several basic economic parameters are then taken into consideration, and some possible programs are established for the integration of nuclear plants.

A last chapter indicates briefly the main impacts on the country's economy that should be expected from the adoption of these programs. An evaluation is made of foreseeable trends regarding namely the cost of electric power and the indirect effects on industrial development, on the balance of payments and on the capital market.